ADDENDUM NO. 1

TO

SPECIFICATIONS

FOR

SECONDARY CONTAINMENT TRUCK FILL STANDS

PROJECT #971026

AT

DOVER AIR FORCE BASE, DELAWARE

22 November 2000

The following changes are made to the above referenced specifications:

1. Delete the Table of Contents in its entirety and replace with the attached Table of Contents.

2. Delete Section 01000, GENERAL in its entirety and replace with the attached Section 01000, GENERAL.

3. Delete Section 01001, SITE MANAGEMENT in its entirety and replace with the attached Section 01001, SITE MANAGEMENT.

4. Delete Section 02720, STORM-DRAINAGE SYSTEM in its entirety and replace with the attached Section 02720, STORM-DRAINAGE SYSTEM.

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SECTION 01000

GENERAL

1.1 SUMMARY OF WORK: Furnish all plant, equipment, supervision, labor, supplies, services, and materials required to accomplish the work indicated in these specifications, the related drawings and as otherwise set forth in the contract.

1.2 SUMMARY OF PROJECT: The project consists essentially of, but is not limited to, the construction of secondary containment truck fill stands at Facilities 729, 736, 738, 753, 754 and 782 and a concrete truck loading pad at Facility 758. The construction of the secondary containments truck fill stands will include, but is not limited to, the removal of existing asphalt roads, concrete pads, and grassed areas, construction of concrete containment fill stands, and associated drainage piping systems.

1.3 WORK SCHEDULE:

1.3.1 Work shall be performed between 7:30 A.M. and 4:30 P.M. daily, Monday through Friday, excluding federal legal holidays as outlined by Public Law Number 98-144 (or days not worked on Dover Air Force Base due to the observance of such holidays). Unless otherwise specifically authorized herein or in writing by the Contracting Officer, the scheduling of work for times other than as set forth above, is not permitted.

1.3.2 Power outages and limited utility interruptions for hookups will be permitted in accordance with a previously arranged schedule. The Contractor is responsible for notifying and coordinating all outages with the Base Civil Engineer Contract Management Section at least 5 working days in advance of the intended outage.

1.4 EARTH WORK:

1.4.1 AF Form 103, Excavation Permit, is required to be obtained from the government prior to excavating the site. Dover AFB Instruction Regulation entitled Work Clearance Requirement requires the contractor to obtain a Work Clearance Request (WCR) (excavation permit) as indicated below:

1.4.1.1 The project engineer will initiate the request and oversee the proper coordination of the request; however, it is the contractor that processes the request. Notify the government inspector of the need for the WCR no earlier than 10 days and no later than five working days before excavating. The contractor shall take the WCR and a site map to include grid location showing proposed construction and the surrounding existing facilities to the Production Control Center (PCC), Building 600, to obtain the proper signatures (CECC, CEVC, CEVR, and Communications). The contractor is also responsible for contacting Miss Utility.

**NOTE**: Under the current AF Form 103 process it is the responsibility of the contractor to obtain clearance from Miss Utility (phone 1-800-282-8555) for utility services not owned by Dover AFB (i.e. Chesapeake Utility's steel gas lines, AT&T communication lines, Comcast Cablevision lines, & Kent County sewer lines). Call Miss Utility prior to submitting the request to CE customer service. Be sure to adequately describe the exact location and type of work involved to Miss Utility in lieu of, perhaps, just the title of the

job. Specifically address required excavation work and the exact location of the excavation. The Government process makes this communication solely the responsibility of the contractor.

1.4.1.2 The contractor will mark the location of the dig in the field, in white, within 18 inches of the proposed excavation prior to the Government shops visiting the site. If the required location of the job site changes, the request must be revalidated and reapproved. The contractor is responsible for protecting the markings made by the government and/or Miss Utility. If the markings disappear or become unreadable, all work will stop and remarking will be done. Remarking may require collection of remarking cost to be paid by the contractor. A new work clearance will be processed to obtain new markings. Digging must begin within 21 calendar days of issue or the request will expire.

1.4.1.3 In the event any damage occurs to a utility, notify the PCC at 677-2856.

1.4.1.4 Provide the government inspector with a copy of the signed and approved AF Form 103 after receipt of same.

1.4.1.5 Once digging is complete the contractor will notify PCC.

1.4.2 The contract drawings require sediment and erosion control. The government obtains an excavation permit through DNREC. State law requires that contractor take measures to control sediment erosion. Failure to execute sediment and erosion control measures and maintain them throughout the duration of the contract and/or until permanent measures have been established may result in a Notice of Violation from the State of Delaware and fines against the Contractor's Company.

1.5 WORK CONDITIONS: The work to be performed under this project will be on an occupied facility. The Contractor will cooperate to the fullest extent with the occupants to facilitate the completion of the project as well as to allow the occupants to continue their normal activities.

1.6 QUALITY CONTROL:

1.6.1 In addition to the requirements specified in the FAR clause "Inspection of Construction", the Contractor shall designate in writing, an individual responsible for managing the Contractor's inspection program. Such designation shall be made to the Contracting Officer prior to commencement of work on the job site.

1.6.2 The Government will require that work progress in stages when verification of the quantity, adequacy and/or accuracy of underlying work is necessary before follow-on work is allowed to start. When required by these specifications, such verifications shall be mandatory, and an allowance for these verifications shall be made in the Contractor's Contract Progress Schedule. The Contractor shall provide notification that work is ready for verification in accordance with the requirements outlined on the Mandatory Verification Schedule. Required mandatory verifications are as listed by the schedule.

1.7 ADVANCE NOTIFICATION: It is required that the Contractor provide at least a 24 hour advance notification to establish when on-site work will start initially, and prior to restarting on-site work following any

discontinuances lasting longer than five normal workdays. Notification may be provided by phone, in person, or in writing, and shall be given directly to the designated "inspector", the Chief of Construction Element, or the secretary for the Construction Element with offices in Building 600 on Dover Air Force Base, telephone (302) 677-6450. The mailing address is 436 CES/CECC, Dover AFB, DE, 19902-6600.

1.8 MANUFACTURER'S INSTALLATION INSTRUCTIONS: Manufacturer's instructions pertaining to the use or installation of products, materials, or equipment used or installed in the prosecution of work under this contract, whether furnished as a normal, usual or customary practice of the manufacturer or if furnished in response to a requirement stipulated herein, form a part of these specifications as though specifically set forth herein. In the event of conflict between the specifications or drawings and manufacturers' instructions, the Contractor shall bring such conflict to the attention of the Contracting Officer for resolution before proceeding with the work involved.

1.9 MATERIAL AND EQUIPMENT DISPOSAL, GENERAL:

1.9.1 Hazardous Materials: Materials classified as hazardous by federal or state environmental rules, regulations, or laws, shall be handled and processed for disposal in accordance with those rules, regulations, or laws. The contractor shall submit a list of all hazardous materials used on the project along with a Material Safety Data Sheet (MSDS). These materials must be approved prior to being brought on to the Base. On a quarterly basis the contractor shall submit a report documenting the quantities of hazardous materials used on the Base. The Contractor is responsible for all such materials that are residue from Contractor furnished supplies and materials which were brought to the job site by the Contractor, and for any such materials identified herein or by the drawings. For the disposal of any existing hazardous waste removed from Base facilities, contact CEV for signing all associated manifests.

1.9.2 The Contractor is responsible for the collection and disposal of all debris, rubble, residue and waste material generated in the performance of work under this contract. All such materials shall be removed from Dover Air Force Base by the Contractor, recycled and/or disposed of in a State approved permitted landfill. The contractor shall recycle concrete, untreated wood and other demolition debris as required by Exective Order 13101. The Contractor is not permitted to deposit any such materials in base trash collection containers or at any on-base location without prior approval of the Contracting Officer. The Contractor is responsible for remediating and/or reimbursing the Base for any spills caused by him, his personnel and/or his equipment.

1.10 COORDINATION OF WORK: The Contractor shall coordinate the work of subcontractors and shall ensure the coordination of the work between the various trades. In many instances the contract drawings indicate only the general location and arrangement of equipment, fixtures, piping, conduit, or outlets and may not in all cases show, identify or detail all materials or components that are necessary, usual and customary for proper installation, connection or attachment. The Contractor shall study, examine and evaluate the contract drawings to establish the work, coordination, or materials

required and necessary to provide a product complete in the usual and customary manner, and shall provide for all such requirements as though expressly detailed herein or on the drawings.

1.11 AS-BUILT DRAWINGS: The Contractor shall maintain and keep current one set of drawings which shall be annotated in red pencil to show all as-built construction. These as-built drawings shall be submitted to the Contracting Officer at Final Inspection. The as-built drawings shall clearly and accurately depict any deviations or changes to both existing and new construction from that which is indicated on the construction drawings.

1.11.1 As-Built Data: The Contractor shall also enter specific as-built data in the designated information blocks provided adjacent to various equipment or other items on the drawings. This as-built data may include information such as manufacturer's name, model, size, horsepower etc., of the equipment physically installed under the project, or elevations and locations of underground utilities.

1.11.2 Government Review: Time allowed for Government review of the as-built drawings will be, exclusive of day of receipt by the Contracting Officer and the day of return, 10 working days. Government comments and reasons in the event of disapproval will be in writing.

1.12 CHARGES FOR UTILITY SERVICES:

1.12.1 As outlined in FAR Clause "Availability and Use of Utility Services", electric service to Contractor-furnished office or storage facilities will be charged at the current rate prescribed by Air Force regulation. The service connection must be made through a Contractor furnished kilowatt hour meter appropriate for the circumstances.

1.12.2 Contractor is responsible for all costs associated with telephone service. Telephone service will not be Government furnished.

1.13 REFERENCED PUBLICATIONS:

1.13.1 Specifications: The document titled "Delaware Standard Specifications, Specifications for Road and Bridge Construction", dated January 1998, including Supplemental Specifications issued 3 August 1998, hereinafter referred to as the Standard Specifications, shall govern the work performed as required by this specification, and form a part of this specification to the extent indicated by the references thereto. For the purposes of this project, all references to the "Director", "Inspector", or "Engineer" in the Standard Specifications shall be construed to mean "Contracting Officer". In the event of conflict between this specification and the Standard Specifications, this specification shall govern.

1.13.2 Standards: The document titled "Delaware Erosion and Sediment Control Handbook for Development", dated 1989, hereinafter referred to as the Delaware Handbook, shall govern the work performed as required by this specification, and form a part of this specification to the extent indicated by the references thereto. In the event of conflict between this specification and the Delaware Handbook, this specification shall govern.

1.13.3 Drawings: The document titled "The State of Delaware Department of Transportation Standards" (latest edition as of the date of this contract),

hereinafter referred to as the Standard Drawings, shall govern the work performed as required by this specification, and form a part of this specification to the extent indicated by the references thereto.

1.14 RADIOACTIVE MATERIALS:

1.14.1 At least 7 days before any radioactive material is brought on Dover AFB, the contractor will provide the following to the base radiation protection officer (telephone (302) 677-2595, fax (302) 677-4948), 436 AMDS/SGPB, 260 Chad St, Dover AFB, DE 19902-7307:

1.14.1.1 A brief description of the proposed activities.

1.14.1.2 The dates the radioactive material will be used on base.

1.14.1.3 The name of the contractor and contracted project under which the work is being done.

1.14.1.4 A copy of the NRC or agreement state license authorizing the use of the radioactive materials.

1.14.1.5 The name, local address, and telephone number of the responsible local representative and the name, address, and telephone number of the radiation safety officer on their license.

1.14.1.6 An acknowledgment that the base radiation safety officer can make periodic checks to ensure that contractor personnel follow radiation safety practices to prevent exposures to Air Force personnel and avoid contamination of Government property.

1.14.2 Agreement state licensees using NRC regulated materials must supply a copy of the NRC Form 241 approved by Region I of the NRC.

1.14.3 Contractors holding agreement state licenses, who operate for more than 180 calendar days per year on Air Force or other installations where exclusive federal jurisdiction exists, must obtain an NRC license.

--END OF SECTION--

SECTION 01001

SITE MANAGEMENT

PART 1 GENERAL

1.1 GENERAL : The appearance of construction sites at Dover Air Force Base is of paramount importance to the Commander of Dover Air Force Base. A clean and well kept construction site will help ensure proper compliance with the safety and environmental requirements of the contract. The management element of the Contractor's performance rating will be affected by the compliance with this specification. The Contractor shall comply with all of the requirements specified herein and associated specification sections.

1.2 SUBMITTALS: The following shall be submitted:

1.2.1 Site Layout Plan

Submit for approval a detailed scaled plan drawing showing the layout of the construction site prior to starting work. As a minimum the drawing shall include the locations of office and storage trailers, required utility connection points, equipment storage and material staging areas, construction entrance(s) including temporary stabilized construction entrance where required, contractor employee parking areas, shadow box fence including placement of safety signs (i.e. hard hat area, etc.), and trash dumpsters and containers. The submittal shall also include photographs of the site prior to disturbance by the start of work.

1.2.2 Dust Control Plan

Submit a plan for controlling the accumulation of dirt, debris, and dust on roadways and other surfaces adjacent to the construction site. As a minimum the plan shall include the name of the contractor including a designated point of contact, equipment to be used for cleaning the streets of this material, and the measures to be taken to reduce transportation of mud onto adjacent roadways (i.e. rotating or replacing the stones in the temporary stabilized construction entrance to clean the truck tires).

PART 2 PRODUCTS

2.1 DUMPSTERS

The dumpsters shall be painted to match formula #BLK 1P32 YOX 1P39 OXR 19 "Eagle Feather Tan", free of graffiti, and be equipped with a securable cover. The cover shall be in place at all times except when trash is being deposited or removed.

2.2 TRASH CONTAINERS

Trash containers shall consist of 210 liter (55 gallon) drums painted to match formula #BLK 1P32 YOX 1P39 OXR 19 "Eagle Feather Tan", free of graffiti, and have "TRASH" printed in 250 mm (10 inch high) white lettering on the side of the container at two locations opposite each other. The Contractor shall provide a minimum of one trash container for each 3050 square meters (10,000 square feet) of construction area.

2.3 OFFICE/STORAGE TRAILERS/SITES (Only required if the contractor elects to place a storage and/or office trailer on site and/or store materials on site for over 30 days.)

2.3.1 Contractor's office and storage trailers shall be in new or like new condition and be painted to match "Eagle Feather Tan" or approved equal on the exterior. Each trailer shall have an emergency notification card (5 x 7 or 3 x 5) in a weatherproof holder affixed on the outside of the trailer near the entry door. The card shall indicate the name of the Contractor, and the name and telephone number of the point of contact for emergency notification. Provide trailer foundation skirting of either lattice or metal panel design. Storage of materials and debris under the trailers is prohibited. The trailer shall be securely fastened to the ground with appropriate fastening devices to adequately brace the structure against hurricane force winds.

2.3.2 The contractor will be provided with storage sites as deemed necessary to support the construction. The primary site is the construction site. The supplemental site, if needed, may not be in close proximity to the construction site, but will be on Dover Air Force Base.

2.4 SHADOW BOX FENCE(Only required if the contractor elects to place a storage and/or office trailer on site and/or store materials on site for over 30 days.): The shadow box fence shall be constructed as follows and in accordance with the details shown on contract drawings.

2.4.1 The Government shall supply the Contractor with fence panels approximately 8'-0" long. Panels shall consist of red or white cedar, board on board style, 2" x 4" top and bottom rails, 1" x 6" boards extending to six feet above grade.

2.4.2 Fence posts shall be provided by the Contractor. Fence posts shall be red or white cedar, 4" x 4" posts that extend three feet into the ground.

2.4.3 The fence shall consist of panel sections attached to posts by bolted connections to permit disassembly at the project conclusion without damage to the components. The Contractor shall provide all associated accessories and connections required for assembly of the shadow box fence.

2.5 ELECTRICAL SERVICE(Only required if the contractor elects to place a storage and/or office trailer on site and/or store materials on site for over 30 days.): Where electrical service is desired at the contractor's facilities, connection shall be made in accordance with the detail at the end of this section entitled 'Electrical Service to Contractor Facilities.'

2.6 SANITATION FACILITIES: The contractor shall provide portable sanitation facilities. Portable sanitation facilities shall be self-contained units with both urinals and stool capabilities. Units shall be adequately ventilated, cleaned and emptied at least once a week or more if determined necessary and directed by the Contracting Officer. The doors shall be self-closing and securable. The exterior of the unit shall match "Eagle Feather Tan". Locate these facilities out of the view of the public, within the construction fence area.

2.7 CONSTRUCTION ACCESS ROUTE SIGNS: Any construction access route signs which the contractor may wish to erect in order to facilitate location of the site by suppliers or subcontractors must receive prior approval by the Contracting Officer. Approved signs shall not exceed 12" x 18" in size, shall consist of white letters on a dark brown background (back of sign and post shall be dark brown also), and be mounted at locations approved by the Contracting Officer.

PART 3 EXECUTION

3.1 CONSTRUCTION SITE LAYOUT

The contractor shall arrange the office trailers, storage trailers, construction entrance, sanitation facilities, and trash dumpsters to effectively use the area designated on the plans. The contractor shall indicate at least one construction entrance for the project.

3.2 TEMPORARY STABILIZED CONSTRUCTION ENTRANCE

The nature of the project may also require a temporary stabilized construction entrance at non-paved areas when exiting to paved areas. The entrance shall be constructed as required by the Sediment and Stormwater Management Plan permit drawings. The contractor shall maintain the temporary stabilized construction entrance such that it functions adequately in the removal of sediment from construction vehicle tires. Stones in the entrance shall be periodically rotated or changed to ensure construction vehicle tires are clean when leaving the site.

3.3 CLEANING ROADWAYS

The contractor shall make special effort to prevent the generation of dirt, debris, or dust as a result of activities related to the work under this contract. All roadways adjacent to the construction site which accumulate construction dirt, debris, dust, or other foreign materials as a result of activities related to this contract shall be cleaned at least daily or more often if determined necessary and directed by the Contracting Officer in order to maintain a neat appearance. The method of cleaning shall remove and not just displace the material.

3.4 TRASH REMOVAL

The 55 gallon trash containers shall be emptied a minimum of once a day or more often as necessary and directed by the Contracting Officer. The site dumpsters shall be emptied a minimum of once a week or more often if determined necessary and directed by the Contracting Officer in order to keep the site clean of trash. Dumpsters and containers shall not be allowed to overflow and permit trash to enter the site or adjacent areas.

3.5 EROSION CONTROL AND SAFETY FENCE

Erosion control fence and safety fence shall be maintained in a neat and orderly appearance. As a minimum the Contractor shall perform weekly checks of the condition of the erosion control fence and safety fence. Sagging or falling fences shall be immediately repaired.

3.6 SHADOW BOX FENCE: Location of fence shall be as shown on the approved site layout plan.

3.6.1 The Contractor shall stack, load, and transport fence panels from the on-base storage site, not to exceed 5 miles, and deliver and unload panels at the construction site as directed by the Contracting Officer.

3.6.2 The shadow box fence shall be constructed around the perimeter of all construction, staging, and storage areas prior to the start of any work.

3.6.3 Trailers may be on site prior to completion of the fence.

3.7 GRASS CUTTING

Any grass on the construction site shall be cut at least once a week during the growing season. The grass immediately adjacent to both sides of the erosion control fence, safety fence, or shadow box fence shall also be maintained to keep a neat and professional appearance.

3.8 SAFETY SIGNS

Safety signs shall be posted at all entrances to the construction site. The signs shall be "Eagle Feather Tan" unless safety mandates otherwise.

3.9 RESTORATION

3.9.1 Except as otherwise required by the contract, all disturbed or damaged landscaping, paved areas, curbs or sidewalks shall be restored to the original condition. This condition will be as documented in the photographs of the undisturbed site submitted with the site layout plan.

3.9.2 The shadow box fence shall be removed when directed by the Contracting Officer. It shall be carefully disassembled in panel sections and posts in such a manner to minimize damage, stacked, delivered and unloaded at a storage site on Dover Air Force Base as directed by the Contracting Officer. Travel distance from construction site shall not exceed five miles. Fencing which the Contracting Officer determines was abused during use or disassembly shall be replaced by the contractor at no additional cost to the Government.

--END OF SECTION--

SECTION 02720

STORM-DRAINAGE SYSTEM

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ACI INTERNATIONAL (ACI)

| | |
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| ACI 346/346R | (1990) Standard Specification for Cast-in-Place Nonreinforced Concrete Pipe and Recommendations |

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

| | |
|---|---|
| AASHTO HB-16 | (1996) Standard Specifications for Highway Bridges |
| AASHTO M 167 | (1994) Corrugated Steel Structural Plate, Zinc Coated, for Field Bolted Pipe |
| AASHTO M 190 | (1988) Bituminous Coated Corrugated Metal Culvert Pipe and Pipe Arches |
| AASHTO M 198 | (1994) Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets |
| AASHTO M 219 | (1992) Aluminum Alloy Structural Plate for Field Bolted Conduits |
| AASHTO M 243 | (1994) Field Applied Coating of Corrugated Metal Structural Plate for Pipe, Pipe-Arches, and Arches |
| AASHTO M 294 | (1994) Corrugated Polyethylene Pipe, 305- to 915- mm (12-to 36 in.) Diameter |
| AASHTO M 304 | (1994) Poly(Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter |

AMERICAN RAILWAY ENGINEERING ASSOCIATION (AREA)

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| AREA-03 | (1994) Manual for Railway Engineering |

(Fixed Properties): Chapter 1, Roadway and Ballast

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

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|---|---|
| ASTM A 48 | (1994a) Gray Iron Castings |
| ASTM A 123 | (1989a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products |
| ASTM A 444 | (1989) Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process for Storm Sewer and Drainage Pipe |
| ASTM A 536 | (1984; R 1993) Ductile Iron Castings |
| ASTM A 716 | (1995) Ductile Iron Culvert Pipe |
| ASTM A 742 | (1993) Steel Sheet, Metallic Coated and Polymer Precoated for Corrugated Steel Pipe |
| ASTM A 760 | (1995a) Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains |
| ASTM A 762 | (1995) Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains |
| ASTM A 798 | (1994) Installing Factory-Made Corrugated Steel Pipe for Sewers and Other Applications |
| ASTM A 807 | (1996) Installing Corrugated Steel Structural Plate Pipe for Sewers and Other Applications |
| ASTM A 849 | (1994) Post Applied Coatings, Pavings, and Linings for Corrugated Steel Sewer and Drainage Pipe |
| ASTM B 26 | (1996) Aluminum-Alloy Sand Castings |
| ASTM B 745 | (1995) Corrugated Aluminum Pipe for Sewers and Drains |
| ASTM C 12 | (1995) Installing Vitrified Clay Pipe Lines |
| ASTM C 14 | (1995) Concrete Sewer, Storm Drain, and Culvert Pipe |
| ASTM C 32 | (1993) Sewer and Manhole Brick (Made from Clay or Shale) |
| ASTM C 55 | (1995) Concrete Building Brick |

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| ASTM C 62 | (1996) Building Brick (Solid Masonry Units Made from Clay or Shale) |
| ASTM C 76 | (1995) Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe |
| ASTM C 139 | (1995) Concrete Masonry Units for Construction of Catch Basins and Manholes |
| ASTM C 231 | (1991b) Air Content of Freshly Mixed Concrete by the Pressure Method |
| ASTM C 270 | (1996a) Mortar for Unit Masonry |
| ASTM C 425 | (1995) Compression Joints for Vitrified Clay Pipe and Fittings |
| ASTM C 443 | (1994) Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets |
| ASTM C 478 | (1994) Precast Reinforced Concrete Manhole Sections |
| ASTM C 506 | (1995) Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe |
| ASTM C 507 | (1995a) Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe |
| ASTM C 655 | (1994) Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe |
| ASTM C 700 | (1996) Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated |
| ASTM C 789 | (1994) Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers |
| ASTM C 850 | (1994) Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers with Less Than 2 Ft. of Cover Subjected to Highway Loadings |
| ASTM C 877 | (1994) External Sealing Bands for Noncircular Concrete Sewer, Storm Drain, and Culvert Pipe |
| ASTM D 1056 | (1991) Flexible Cellular Materials - Sponge or Expanded Rubber |
| ASTM D 1171 | (1994) Rubber Deterioration - Surface Ozone Cracking Outdoors or Chamber (Triangular Specimens) |

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|---|---|
| ASTM D 1557 | (1991) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.)) |
| ASTM D 1751 | (1983; R 1991) Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) |
| ASTM D 1752 | (1984; R 1996) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction |
| ASTM D 1784 | (1992) Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds |
| ASTM D 2167 | (1994) Density and Unit Weight of Soil in Place by the Rubber Balloon Method |
| ASTM D 2321 | (1989; R 1995) Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications |
| ASTM D 2922 | (1991) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth) |
| ASTM D 3017 | (1988; R 1993) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth) |
| ASTM D 3034 | (1994) Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings |
| ASTM D 3212 | (1992) Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals |
| ASTM D 3350 | (1993) Polyethylene Plastics Pipe and Fittings Materials |
| ASTM F 477 | (1995) Elastomeric Seals (Gaskets) for Joining Plastic Pipe |
| ASTM F 679 | (1995) Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings |
| ASTM F 714 | (1994) Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter |
| ASTM F 794 | (1995a) Poly(Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on |

| | |
|---|---|
| | Controlled Inside Diameter |
| ASTM F 894 | (1995) Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe |
| ASTM F 949 | (1994) Poly(Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings |

1.2 SUBMITTALS

SD-06 Instructions

Placing Pipe.

Printed copies of the manufacturer's recommendations for installation procedures of the material being placed, prior to installation.

SD-13 Certificates

Resin Certification
Frame and Cover for Gratings

Certified copies of test reports demonstrating conformance to applicable pipe specifications, before pipe is installed. Certification on the ability of frame and cover or gratings to carry the imposed live load.

SD-14 Samples

Pipe for Culverts and Storm Drains.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Delivery and Storage

Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris. Gasket materials and plastic materials shall be protected from exposure to the direct sunlight over extended periods.

1.3.2 Handling

Materials shall be handled in such a manner as to ensure delivery to the trench in sound, undamaged condition. Pipe shall be carried to the trench, not dragged.

PART 2 PRODUCTS

2.1 PIPE FOR CULVERTS AND STORM DRAINS

Pipe for culverts and storm drains shall be of the sizes indicated and shall conform to the requirements specified. Pipe may be either ductile iron culvert pipe or PVC.

2.1.1 Ductile Iron Culvert Pipe

ASTM A 716.

2.1.2 PVC Pipe

The pipe manufacturer's resin certification, indicating the cell classification of PVC used to manufacture the pipe, shall be submitted prior to installation of the pipe.

2.1.2.1 Type PSM PVC Pipe

ASTM D 3034, Type PSM, maximum SDR 35, produced from PVC certified by the compounder as meeting the requirements of ASTM D 1784, minimum cell class 12454-B.

2.2 MISCELLANEOUS MATERIALS

2.2.1 Concrete

Unless otherwise specified, concrete and reinforced concrete shall conform to the requirements for 4000 MPa (psi) concrete under Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE. The concrete mixture shall have air content by volume of concrete, based on measurements made immediately after discharge from the mixer, of 5 to 7 percent when maximum size of coarse aggregate exceeds 37.5 mm.(1-1/2 inches.) Air content shall be determined in accordance with ASTM C 231. The concrete covering over steel reinforcing shall not be less than 25 mm(1 inch) thick for covers and not less than 40 mm thick for walls and flooring. Concrete covering deposited directly against the ground shall have a thickness of at least 75 mm(3 inches) between steel and ground. Expansion-joint filler material shall conform to ASTM D 1751, or ASTM D 1752, or shall be resin-impregnated fiberboard conforming to the physical requirements of ASTM D 1752.

2.2.2 Mortar

Mortar for pipe joints, connections to other drainage structures, and brick or block construction shall conform to ASTM C 270, Type M, except the maximum placement time shall be 1 hour. The quantity of water in the mixture shall be sufficient to produce a stiff workable mortar but in no case shall exceed 4 liters of water per sack of cement. Water shall be clean and free of harmful acids, alkalies, and organic impurities. The mortar shall be used within 30 minutes after the ingredients are mixed with water. The inside of the joint shall be wiped clean and finished smooth. The mortar head on the outside shall be protected from air and sun with a proper covering until satisfactorily cured.

2.2.3 Precast Concrete Segmental Blocks

Precast concrete segmental block shall conform to ASTM C 139, not more than 200 mm(8 inches) thick, not less than 200 mm(8 inches) long, and of such shape that joints can be sealed effectively and bonded with cement mortar.

2.2.4 Brick

Brick shall conform to ASTM C 62, Grade SW; ASTM C 55, Grade S-I or S-II; or ASTM C 32, Grade MS. Mortar for jointing and plastering shall consist of one part portland cement and two parts fine sand. Lime may be added to the mortar in a quantity not more than 25 percent of the volume of cement. The joints shall be filled completely and shall be smooth and free from surplus mortar on the inside of the structure. Brick structures shall be plastered with 10 mm(1/2 inch) of mortar over the entire outside surface of the walls. For square or rectangular structures, brick shall be laid in stretcher courses with a header course every sixth course. For round structures, brick shall be laid radially with every sixth course a stretcher course.

2.2.5 Precast Reinforced Concrete Sandfilters

Precast reinforced concrete sandfilters shall conform to ASTM C 478. Joints between precast concrete risers and tops shall be full-bedded in cement mortar and shall be smoothed to a uniform surface on both interior and exterior of the structure.

2.2.6 Frame and Cover

Frame and cover shall be cast ductile iron, ASTM A 536, Grade 65-45-12. Weight, shape, size, and waterway openings shall be as indicated on the plans.

2.2.7 Joints

2.2.7.1 External Sealing Bands

Requirements for external sealing bands shall conform to ASTM C 877.

2.2.7.2 Ductile Iron Pipe

Couplings and fittings shall be as recommended by the pipe manufacturer.

2.2.7.3 PVC Plastic Pipes

Joints shall be solvent cement or elastomeric gasket type in accordance with the specification for the pipe and as recommended by the pipe manufacturer.

2.3 STEEL LADDER

Steel ladder shall be provided where the depth of the sandfilter exceeds 1200 mm.(4 feet.) These ladders will be not less than 406 mm () in width, with 19 mm(3/4 inch) diameter rungs spaced 305 mm apart. The two stringers shall be a minimum 9.5 mm(3/8 inch) thick and 63.5 mm(2-1/2 inches) wide. Ladders and inserts shall be galvanized after fabrication in conformance with ASTM A 123.

2.4 DOUBLE DISC GATE VALVES

a. Gate valves shall be iron body, resilient-seated, non-rising stem, 2-inch square operating nut which shall turn left (counterclockwise) to open, with ample strength to withstand and operate under a working pressure of 200 psi, unless otherwise noted. The trust collar shall be effective fo both opening and closing. Valves shall be manufactured in accordance with AWWA C509 and shall be furnished with mechanical joint ends.

b. Gate valves through 250 millimeters diameter shall be vertical type iwth O-ring stem seals without gearing or by-pass valves.

c. Gate valves shall be coated in accordance with AWWA C550.

d. Buried valves shall be furnished with an extension stem, terminating a maximum of 1200 mm(4 feet) below finished grade, and roadway boxes set to finished grade.

e. Valves shall be American Darling Model CRS-80, Mueller Resilient Seat Gate Valve, or an approved equal.

## PART 3 EXECUTION

### 3.1 EXCAVATION FOR PIPE CULVERTS, STORM DRAINS, AND DRAINAGE STRUCTURES

Excavation of trenches and for appurtenances and backfilling for culverts and storm drains shall be in accordance with the applicable portions of Section 02220 EXCAVATION, BACKFILL, AND COMPACTION and the requirements specified below.

#### 3.1.1 Trenching

The width of trenches at any point below the top of the pipe shall be not greater than the outside diameter of the pipe plus 300 millimeter to permit satisfactory jointing and thorough tamping of the bedding material under and around the pipe. Sheeting and bracing where required shall be placed within the trench width as specified. Care shall be taken not to overexcavate. Where trench widths are exceeded, redesign with a resultant increase in cost of stronger pipe or special installation procedures shall be necessary. Cost of this redesign and increased cost of pipe or installation shall be borne by the Contractor without additional cost to the Government.

#### 3.1.2 Removal of Rock

Rock in either ledge or boulder formation shall be replaced with suitable materials to provide a compacted earth cushion having a thickness between unremoved rock and the pipe of at least 200 millimeters or 13 millimeters for each 300 millimeters of fill over the top of the pipe, whichever is greater, but not more than three-fourths the nominal diameter of the pipe. Where bell-and-spigot pipe is used, the cushion shall be maintained under the bell as well as under the straight portion of the pipe. Rock excavation shall be as specified and defined in Section 02220 EXCAVATION, BACKFILL, AND COMPACTION.

3.1.3 Removal of Unstable Material

Where wet or otherwise unstable soil incapable of properly supporting the pipe, as determined by the Contracting Officer, is unexpectedly encountered in the bottom of a trench, such material shall be removed to the depth required and replaced to the proper grade with select granular material, compacted as provided in paragraph BACKFILLING. When removal of unstable material is due to the fault or neglect of the Contractor in his performance of shoring and sheeting, water removal, or other specified requirements, such removal and replacement shall be performed at no additional cost to the government.

3.2 BEDDING

The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe.

3.2.1 Ductile Iron Pipe

Bedding for ductile iron pipe shall be as shown on the drawings.

3.2.2 Plastic Pipe

Bedding for PVC and PE pipe shall meet the requirements of ASTM D 2321. Bedding, haunching, and initial backfill shall be either Class IB or II material.

3.3 PLACING PIPE

Each pipe shall be carefully examined before being laid, and defective or damaged pipe shall not be used. Plastic pipe shall be protected from exposure to the direct sunlight prior to laying as needed to maintain adequate pipe stiffness and meet installation deflection requirements. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Lifting lugs in vertically elongated metal pipe shall be placed in the same vertical plane as the major axis of the pipe. Under no circumstances shall pipe be laid in water, and no pipe shall be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary. Deflection of installed plastic pipe shall not exceed 4.5 percent of the nominal inside diameter. After backfilling has been completed, the Government may perform a deflection test on the entire length of installed plastic pipeline using a mandrel or other suitable device. Any plastic pipe showing deflections in excess of 4.5 percent shall be removed and replaced at the Contractor's expense. All pipe in place shall be inspected before backfilling, and those pipes damaged during placement shall be removed and replaced.

3.3.1 PVC and Ductile Iron Pipe

Laying shall proceed upgrade with spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow.

## 3.4 DRAINAGE STRUCTURES

### 3.4.1 Inlets

Construction shall be as indicated on drawings.

### 3.5.2 Walls and Headwalls

Construction shall be as indicated on drawings.

## 3.5 STEEL LADDER INSTALLATION

Ladder shall be adequately anchored to the wall by means of steel inserts spaced not more than 1.83 m(6 feet) vertically, and shall be so installed as to provide at least 152 mm(6 inches) of space between the wall and the rungs. The wall along the line of the ladder shall be vertical for its entire length.

## 3.6 BACKFILLING

### 3.6.1 Movement of Construction Machinery

In compacting by rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a culvert or storm drain at any stage of construction shall be at the Contractor's risk. Any damaged pipe shall be repaired or replaced.

-- End of Section --